Overview of Voluntary Agreements in the Industrial Sector

Lynn Price, Ernst Worrell
Energy Analysis Department
Environmental Energy Technologies Division
Lawrence Berkeley National Laboratory

July 2002

Introduction

Agreements to meet specific energy use or energy efficiency targets are used widely in the industrial sector (Bertoldi, 1999; Chidiak, 1999; Hansen and Larson, 1999; Mazurek and Lehman, 1999; Newman, 1998). Such agreements can be viewed as a tool for developing a long-term strategic plan for increasing industrial energy efficiency that fully engages not only the engineers and management at industrial facilities, but also includes government, industry associations, financial institutions, and others. Voluntary agreements, which are typically but not always voluntary, are defined as "agreements between government and industry to facilitate voluntary actions with desirable social outcomes, which are encouraged by the government, to be undertaken by the participants, based on the participants' self-interest" (Storey, 1996). An agreement or target can be formulated in various ways; two common methods are those based on specified energy efficiency improvement targets and those based on specific energy use or carbon emissions reduction commitments. Either an individual company or an industrial subsector, as represented by a party such as an industry association, can enter into such agreements.

There is a wide range of target-setting activities in the industrial sector. Some programs are fully voluntary and rely on information-sharing as the key element to educate and motivate industries to reduce their energy use or greenhouse gas emissions. Others are viewed as virtually mandatory because they are offered by the government as a means to avoid outright regulation or taxation.

Examples of industrial sector agreements and target programs include the following:

- Australia: Energy Smart Business Program (Cooper et al., 1999), Greenhouse Challenge (AAAGO, 2002).
- Canada: Industry Program for Energy Conservation (CIPEC) (Jago, 1999; McKenzie, 1994)
- Denmark: Agreements on Industrial Energy Efficiency (Togeby et al., 1998; Togeby et al., 1999)
- France: Voluntary Agreements on CO2 Reductions (Chidiak, 2000)
- Finland: Agreements on Industrial Energy Conservation Measures (Kraemer, n.d.)
- Germany: Declaration of German Industry on Global Warming Prevention (Ramesohl and Kristof, 1999)

- Japan: Keidanren Voluntary Action Plan on the Environment (Japan Federation of Economic Organizations, 1998)
- Netherlands: Long-Term Agreements on Energy Efficiency (Ministry of Economic Affairs, 1997; Nuijen, 1998; Rietbergen et al., 1998), Benchmarking Covenant
- Norway: Norwegian Industrial Energy Efficiency Network (Institute for Energy Technology, 1998; Finden, 1998)
- Sweden: ECO-Energy (Uggla and Avasoo, 2001)
- U.K.: Climate Change Levy, Energy Efficiency Best Practice Program (Miles, 1994), Energy Efficiency Best Practice Program, Make a Corporate Commitment Campaign (MCCC), Energy-Intensive Industry Sector Efficiency Targets (Environment News Service, 1999; ETSU-AEA Technology, 2001)
- U.S.: Voluntary Aluminum Industrial Partnership; PFC Emissions Reduction Partnership for the Semi-Conductor Industry (U.S. EPA, 2002)

Voluntary agreements typically have a long-term outlook, covering a period of five to ten years. A key element of the agreements is that they focus the attention of all actors on energy efficiency or greenhouse gas emissions reduction goals. The essential components of voluntary agreement programs are the assessment of energy-efficiency potential of the participants as well as target-setting through a negotiated process with all parties. Supporting programs and policies, such as audits, assessments, benchmarking, monitoring, information dissemination, and financial incentives all play an essential role in assisting the participants in meeting the target goals. Overall, voluntary agreements are viewed as an innovative and effective means to motivate industry to improve energy efficiency and reduce greenhouse gas emissions.

National Industrial Sector Voluntary Agreements

There are numerous industrial sector voluntary agreements, as shown in the list above. A number of these can be seen as models because they have proven to be successful and contain elements that can be transferred to other programs. A description of four of these programs is provided below.

The Netherlands

The industrial sector agreements in The Netherlands provide an excellent example of a program based on sector-specific targets. The Dutch Long-Term Agreements on Energy Efficiency were negotiated between government and industry associations over a two-year period and signed in 1992. The agreements are aimed at meeting a national CO2 emission reduction target of 3 to 5% in 2000 compared to 1989. Each industry association signed an agreement with the Dutch Ministry of Economic Affairs committing that industry to achieve specific energy efficiency improvements by 2000. In total, 29 agreements were signed involving about 1000 industrial companies and representing about 90% of industrial primary energy consumption in The Netherlands. The average target was a 20% increase in energy efficiency over 1989 levels by 2000 (Nuijen, 1998; Kerssemeeckers, 2002). The overall LTA program ended in 2000 with an average improvement in energy efficiency of 22.3% over the period 1989 to 2000 (Kerssemeechers, 2002).

The process for setting the targets involved making a preliminary assessment of the energy efficiency potential of each industry as well as an inventory of economically viable measures that could be implemented by the companies within an industry association. These assessments, which were made by an independent government research agency, provided the basis for discussions and negotiations between the industries and the government. The assessments are further used as a basis for the industry Long Term Plans which include an assessment of energy consumption in the base year (1989 in this case), a survey of opportunities for energy efficiency improvement, company energy plans, monitoring and energy management in each company, research and development of new low-energy technologies, demonstration projects for energy savings measures, assistance to individual companies, and information dissemination (Nuijen, 1998).

Once the Long Term Plan is established, the Long Term Agreement was signed by the industry association, the Ministry of Economic Affairs, and the independent government research agency. The Long Term Agreements are contracts under civil law which are legally binding and pre-empt future regulatory requirements.

An essential element of the sector targets was the supporting policies and programs of the government. In the case of The Netherlands, the Ministry of Economic Affairs provided a great deal of support to the industries that sign Long Term Agreements including tax rebates for energy-efficient investments, subsidies, detailed audits of industrial facilities (including an inventory of energy-consuming equipment, assessment of energy use, and identification of cost-effective energy-efficient investments) and coordination of regulatory measures aimed at energy efficiency in industry (Nuijen, 1998).

Recent evaluations of the Long-Term Agreements have found that the agreements helped industries to focus attention on energy efficiency and find low-cost options within commonly used investment criteria (Korevaar et al., 1997; Rietbergen et al., 1998). Although the agreements themselves proved to be successful and cost-effective (Rietbergen et al., 1998), various support measures were implemented within the system of voluntary agreements. It is difficult to attribute the energy savings to a specific policy instrument; rather, it is the result of a comprehensive effort to increase implementation and development of energy-efficient practices and technologies in industry by removing or reducing barriers. This emphasizes the importance of offering a package instead of a set of individual measures, which may give the idea of competing measures or instruments rather than a concerted action. Evaluations also found that the costs of voluntary agreements, from the perspective of the government, are about $50/t of carbon reduced compared with costs of about $140/t of carbon reduced through subsidy schemes (Blok, 2002).

Following the current Long-Term Agreements on energy efficiency, a new agreement has been developed for the energy-intensive industries. In the new agreements, industry groups agree to strive to be among the world's most energy efficient producers by 2012. The agreement will use benchmarking of regions (with a similar production capacity as in The Netherlands) to monitor and verify the results of the industry efforts.

Denmark

Denmark has committed to reduce national CO2 emissions from all sectors by 20% in the year 2005 compared to 1988 emissions (Togeby et al., 1999). The industrial sector is expected to contribute to this goal by reducing CO2 emissions by 4.6% in 2005 relative to 1988 emissions (Togeby et al., 1998). The Danish Agreements on Industrial Energy Efficiency are based on the imposition of a mandatory carbon dioxide emissions tax where the level of taxation depends on the purpose of the energy use, the type of energy used, and whether an agreement exists between the company and the Danish Energy Agency. The agreements, which are made by an individual company or an association of companies with the Energy Agency, are made for a period of three years in order to qualify for a lower CO2 tax rate. Between 1996 and 1998, 143 companies entered into agreements with the Danish Energy Agency, representing 45% of total industrial energy consumption in Denmark. Under the agreements, the companies are required to implement all "profitable" energy savings projects which are defined as projects with payback periods of up to four years as identified in an energy audit. The energy audits are performed by an authorized energy consultant or company staff and they must be verified by an independent certified organization. In addition, companies must introduce energy management and motivate staff to ensure investments in new equipment will be energy efficient. Subsidies are provided for up to 30% of the cost of these investments in energy-efficient projects.

One analysis of this program found that firms with an agreement in 1993 had electricity savings of 7% while those who did not have agreements (and thus were subject to the full CO2 tax) had electricity savings of 8% (Bjorner and Togeby, 1999), illustrating that similar savings can be achieved through policies and measures as those achieved using taxation alone. To date, these agreements have seen a reduction in energy consumption of 2 to 4% of total energy consumption per agreement after three years (exceeding business-as-usual by about 1% per year) (Togeby et al., 1999). If this rate of improvement continues, it is projected that the goal of 4.6% reduction in total CO2 emissions from industry in 2005 relative to 1988 will be met (Togeby et al., 1998).

Norway

The Norwegian Industrial Energy Efficiency Network (IEEN) is basically an information network that disseminates information through a quarterly newsletter and annual report, as well as provides energy management and analysis support for the members of the network. The IEEN focuses on small and medium enterprises and, by March of 1998, was comprised of 534 companies from 13 industrial sectors representing 40% of industrial energy use in Norway (Institute for Energy Technology, 1998). The IEEN also collects energy use data and performs benchmarking by comparing a facility to its peers. Demonstration programs are financed up to 50% by IEEN and sector and technologies studies are financed completely by IEEN. To date, this program has seen an average annual intensity improvement of 1.4% among participating sectors (Finden, 1998). One analysis found that a majority of the IEEN members experienced increased production and reduced specific energy consumption between 1995 and 1997 (Institute for Energy Technology, 1998).

Canada

The Canadian Industry Program for Energy Conservation (CIPEC) is a completely voluntary program in which collective targets are set for each industrial sector. There are 21 sector tasks forces representing 31 trade associations and about 3000 companies. Under the program, the sector tasks forces identify energy efficiency opportunities, review and address the barriers associated with these opportunities, and develop and implement strategies for realization of the opportunities. The program includes annual measuring and reporting by industry participants. Benchmarking is conducted in which facilities are compared to the industry mean as well as to a "best practice" which is defined as the top quartile. Since 1990, this program has seen an average annual energy intensity improvement of 0.9%. Also since 1990, GDP from the CIPEC industrial sectors rose 17.2% and energy use rose 10% (Jago, 1999; McKenzie, 1994).

Evaluations of Voluntary Agreements

A recent analysis of five of industrial sector agreement programs found significant differences between the structure of the agreements and the performance and effectiveness of the agreements. This analysis concluded that "the effectiveness of voluntary agreements can be seen as strongly dependent on the accompanying policy mix and the supporting framework which has to be adapted to the specific conditions of the target group envisaged" (Krarup and Ramesohl, 2000).

Another analysis of seven voluntary agreement programs found that the programs could be attributed with about 50% of the observed energy-efficiency improvement or emissions reductions. In addition to these so-called direct effects of the programs, there are also important medium and long-term impacts including changes of attitudes and awareness of managerial and technical staff and in corporate culture, addressing barriers (market, institutional, regulatory, and other) to technology adoption and innovation, creating market transformation to establish greater potential for sustainable energy-efficiency investments, promoting positive dynamic interactions between different actors involved in technology R&D, deployment, and market development, and facilitating cooperative arrangements that provide learning mechanisms within a sector or industry to combine knowledge and develop new competencies in industry (Dowd, et al., 2001; Delmas & Terlaak, 2000).

Based on experience to date, the "Seven Golden Rules" for these type of agreements are: 1) Make sure they are negotiated agreements based on assessments of energy efficiency potentials that are more than "business-as-usual", 2) set clear, well-defined targets and specific timetables for achieving those targets, 3) ensure long-lasting government support in the form of policies and programs that assist industries in implementing energy-efficiency improvements, 4) focus on large, energy-intensive industries to start with because this is where the greatest saving are found, 5) establish clear monitoring guidelines, 6) evaluate progress using physical energy intensity measurements, and 7) provide for independent verification of progress (Blok, 2000).

References

Australian Government Office, 2002. Greenhouse Challenge. http://www.greenhouse.gov.au/challenge/html/about/about.html

Bertoldi, P., 1999. "The Use of Long-Term Agreements to Improve Energy Efficiency in the Industrial Sector: Overview of the European Experiences and Proposal for a Common Framework," *Proceedings of the 1999 American Council for an Energy-Efficient Economy Summer Study on Energy Efficiency in Industry*. Washington, DC: ACEEE.

Bjorner, T.B. and Togeby, M., 1999. "Industrial Companies' Demand for Energy Based on a Micro Panel Database – Effects of CO2 Taxation and Agreements in Energy Savings," in *Energy Efficiency and CO2 Reduction: The Dimensions of Social Change: 1999 European Council for an Energy-Efficient Economy Summer Study*, May 31-June 4, Mandelieu, France.

Blok, K., 2002. "Establishing Targets for Energy Consumption in Energy-Intensive Industries: Examples," Presentation at the *Workshop on Voluntary Agreements for China's Industrial Sector*, February 25-28, 2002.

Blok, K., 2000. "Experiences with Long Term Agreements on Energy-efficiency Improvements in the European Union," Presentation at the *Workshop on Learning from International Best Practice Energy Policies in the Industrial Sector*, May 22-23,2000, Beijing.

Chidiak, M. 2000. *Voluntary Agreements – Implementation and Efficiency. The French Country Study: Case Studies in the Sectors of Packaging, Glass, and Aluminum*. Paris: CERNA

Chidiak, M., 1999. "Voluntary Agreements for Energy Efficiency in Five EU Countries," in *Energy Efficiency* and *CO2 Reduction: The Dimensions of Social Change: 1999 European Council for an Energy-Efficient Economy Summer Study*, May 31-June 4, Mandelieu, France.

Cooper, D., Duncan, R., Precious, B., Williamson, A., and Workum, N., 1998. "Creating Demand for Energy Efficiency in Australian Industry," *Proceedings of the 1999 American Council for an Energy-Efficient Economy Summer Study on Energy Efficiency in Industry*. Washington, DC: ACEEE.

Delmas, Magali, and Terlaak, A., 2000. "Voluntary Agreements for the Environment: Innovation and Transaction Costs," CAVA Working Paper 00/02/13, February.

Dowd, J., Friedman, K., and Boyd, G., "How Well Do Voluntary Agreements and Programs Perform at Improving Industrial Energy Efficiency," *2001 ACEEE Summer Study on Energy Efficiency in Industry*, Washington, DC: American Council for an Energy-Efficient Economy.

Environment News Service, 1999. "UK Industries Trade Emissions Cuts for Tax Rebate," http://ens.lycos.com/ens/dec99/1999L-12-23-03.html

ETSU - AEA Technology, 2001. *Climate Change Agreements – Sectoral Energy Efficiency Targets*. Version 2. Oxfordshire, UK: ETSU – AEA Technology.

Finden, P., 1998. "Norwegian Industry's Network for Energy Conservation," in Martin et al., (eds.) *Industrial Energy* Efficiency *Policies: Understanding Success and Failure: Proceedings of a Workshop Organized by the International Network for Energy Demand Analysis in the Industrial Sector*. Utrecht, The Netherlands, June 11-12, 1998. (LBNL-42368).

Hansen, K, and Larsen, A., 1999. "Voluntary Agreements in Industry: A Comparative Description of the Process and a Normative Analysis," *Proceedings of the 1999 American Council for an Energy-Efficient Economy Summer Study on Energy Efficiency in Industry*. Washington, DC: ACEEE.

Institute for Energy Technology, 1998. *Norwegian Industrial Energy Efficiency Network*. Kjeller, *Norway*: Institute for Energy Technology.

Jago, P., 1999. "The Canadian Industry Program for Energy Conservation (CIPEC): the Dynamics of a 24-year Partnership Between Government and Industry," *Proceedings of the 1999 American Council for an Energy-Efficient Economy Summer Study on Energy Efficiency in Industry*. Washington, DC: ACEEE.

Japan Federation of Economic Organizations, 1998. *Outline of the 1st Follow-up Under the Keidanren Voluntary Action Plan on the Environment*, http://www.keidanren.or.jp/english/policy/pol097/outline/html.

Kerssemeeckers, M., 2002. *The Dutch Long-Term Voluntary Agreements on Energy Efficiency Improvement in Industry*. Utrecht, The Netherlands: Ecofys.

Korevaar, E., J. Farla, K. Blok and K. Schulte Fischedick, 1997. "A Preliminary Analysis of the Dutch Voluntary Agreements on Energy Efficiency Improvement" "*The Energy Efficiency* Challenge, *Proc. 1997 ECEEE Summer Study*, Splinderuv Mlyn, Czech Republic, 9-14 June 1997.

Kraemer, T., *Energy Policy Instruments: Description of Selected Countries*. Denmark: Institute of Local Government Studies.

Krarup, S. and Ramesohl, S., 2000. *Voluntary Agreements in Energy Policy – Implementation and Efficiency: Final Report*. Copenhagen: AKF.

Mazurek, J. and Lehman, B., 1999. "Monitoring and Verification of Long-Term Voluntary Approaches in the Industrial Sector: An Initial Survey," *Proceedings of the 1999 American*

Council for an Energy-Efficient Economy Summer Study on Energy Efficiency in Industry. Washington, DC: ACEEE.

McKenzie, R., 1994. "Canada's National Partnership Strategy for Industrial Energy Efficiency," *in* International Energy Agency, *Conference Proceedings - Industrial Energy Efficiency: Policies and Programs*, Washington, DC, 26-27 May, 1994.

Miles, J., 1994. "*The* UK Energy Efficiency Best Practice Programme," in International Energy Agency, *Conference Proceedings - Industrial Energy Efficiency: Policies and Programs*, Washington, DC, 26-27 May, 1994.

Ministry of *Economic* Affairs, 1998. *Long Term Agreements on Energy Efficiency: Progress in 1996*. The Hague: The Netherlands: Ministry of Economic Affairs.

Ministry of Economic Affairs, 1999. *Meerjarenafspraken over Energy Efficiency - Resultaten 1998 (Long Term* Agreements *on Energy Efficiency - Results 1998*), The Hague, *The* Netherlands: Ministry of Economic Affairs (in Dutch).

Newman, J., 1998. "Evaluation of Energy-Related Voluntary Agreements," in Martin et al., (eds.) *Industrial Energy Efficiency Policies: Understanding Success and Failure: Proceedings of a Workshop Organized by the International Network for Energy Demand Analysis in the Industrial Sector*. Utrecht, The Netherlands, June 11-12, 1998. (LBNL-42368).

Nuijen, W., 1998. "Long Term Agreements on Energy Efficiency in Industry," in Martin et al., (eds.) *Industrial Energy Efficiency Policies: Understanding Success and Failure: Proceedings of a Workshop Organized by the International Network for Energy Demand Analysis in the Industrial Sector*. Utrecht, The Netherlands, June 11-12, 1998. (LBNL-42368).

Ramesohl, S. and Kristof, K., 1999. "What is the Role of Energy-Related Voluntary *Approaches* in the Post-Kyoto Climate Policy? A Process Oriented Analysis of the 'Declaration of German Industry on Global Warming Prevention'," in *Energy Efficiency and CO2 Reduction: The Dimensions of Social Change: 1999 European Council for an Energy-Efficient Economy Summer Study*, May 31-June 4, Mandelieu, France.

Rietbergen, M., Farla, J., and Blok, K., 1998. "Quantitative Evaluation of Voluntary Agreements on Energy Efficiency," in Martin et al., (eds.) *Industrial Energy Efficiency Policies: Understanding Success and Failure: Proceedings of a Workshop Organized by the International Network for Energy Demand Analysis in the Industrial Sector.* Utrecht, The Netherlands, June 11-12, 1998. (LBNL-42368).

Storey, M., 1996. *Demand Side Efficiency: Voluntary Agreements with Industry, Policy and Measures for Common Action.* Paris: Organization for Economic Cooperation and Development (Working Paper 8).

Togeby, M., Bjorner, T.B., and Johannsen, K., 1998. “Evaluation of the Danish CO2 Taxes and Agreements,” in Martin et al., (eds.) *Industrial Energy Efficiency Policies: Understanding Success and Failure: Proceedings of a Workshop Organized by the International Network for Energy Demand Analysis in the Industrial Sector*. Utrecht, The Netherlands, June 11-12, 1998. (LBNL-42368).

Togeby, M., Johannsen, K., Ingrslev, C., Thingvad, K., and Madsen, J., 1999. “Evaluations of the Danish *Agreement* System,” *Proceedings of the 1999 American Council for an Energy-Efficient Economy Summer Study on Energy Efficiency in Industry*. Washington, DC: ACEEE.

Uggla, U. and Avasoo, D., 2001. “EKO-Energi – Successful Voluntary Agreements on Energy Efficiency and Environmental Control in Swedish Industry.” *Proceedings of the 2001 ECEEE Summer Study. European Council for an Energy-Efficient Economy*.

U.S. Environmental Protection Agency, 2002. *Voluntary Aluminum Industrial Partnership (VIAP) Program*. http://www.epa.gov/highgwp1/vaip/